SOV/180-59-3-24/43

AUTHORS: Orlov, L.G. and Utevskiy, L.M. (Moscow)

TITLE: The Differences in Carbide Formation at Grain Boundaries and within the Grains of a Quenched Steel During Tempering

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 3, pp 132-134(USSR)

ABSTRACT: The steel 20Kh2N2 containing 0.2% C, 2% Cr and 2% Ni was investigated. An electronmicrograph is shown in Fig 1a. It can be seen that the size and shape of the particles in the grain boundaries and within the grains are different. The chemical composition was determined by microdiffraction in the electron microscope. The electronmicrograph and the diffraction pattern of the particle at the grain boundary are shown in Fig 1b and 1c and an electronmicrograph of particles within the grains in Fig 2. The particle in the grain boundary (after heating for 75 hours at 500°C) was Cr_7C_3. After heating at 650°C for 2 hours however, particles of $(Cr,Fe)_7C_3$ were detected. For these to form, diffusion of both carbon and chromium is necessary. No enriching of the

Card 1/2

The Differences in Carbide Formation at Grain Boundaries and Within the Grains of a Quenched Steel During Tempering

surface layers of the grains by chromium was detected. There are 2 figures and 7 references, 1 of which is English and 6 Soviet.

ASSOCIATION: Institut metallovedeniya i fiziki metallov TsNIIChM (Institute of Metals Technology and Metal Physics, TsNIIChM)

SUBMITTED: March 26, 1959

UTEVSKIY, L.M., kand.tekhn.nauk

Some problems in the use of the semidirect method of electron microscopy for the study of multiphase alloys. Probl.metalloved. i fiz.met. no.6:381-388 '59. (MIRA 12:8)
(Electron microscopy) (Alloys--Metallography)

S/137/62/000/005/018/150
A006/A101

AUTHORS: Spasskiy, M. N., Utevskiy, L. M.

TITLE: High-frequency vacuum melting furnace

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 5, 1962, 52, abstract 5V309 ("Sb. tr. In-t metalloved. i fiz. metallov Tsentr. n.-i. in-ta chernoy metallurgii", 1959, v. 6, 520 - 526)

TEXT: A description is given of a new design of a high-frequency vacuum melting furnace and its operation during one year. The melting time in the furnace is 40 - 60 min. The main characteristic feature in the furnace design is the method of fixing a double-wall water-cooled quartz tube and the installation of the crucible and the mold in it. To prepare the furnace for the heat, the quartz tube is not to be removed. The vacuum system, consisting of a diffusion (H-5) and forevacuum (BH-1) pump, produces a pressure in the furnace of $< 10^{-4}$ mm Hg. The inductor displacement requires a minimum force. The stopper device ensures the necessary holding of the metal in liquid state and vacuum casting. The furnace design ensures convenient and safe operation.

[Abstracter's note: Complete translation] D. Kashayeva

Card 1/1

16(7) SOV/32-25-4-24/71

AUTHORS: Yermanovich, N. A., Longinov, M. F., Orlov, L. G., Utevskiy, L.M.

TITLE: Examination of Interdendritic Nonmetallic Streaks in Cast Steel (Obnaruzheniye mezhdendritnykh nemetallicheskikh prosloyek v litoy stali)

PERIODICAL: Zavodskaya Laboratoriya, 1959, Vol 25, Nr 4, pp 440-442 (USSR)

ABSTRACT: Sites of fracture in some structural steels (40 KhNMA, 12Kh2N4A, 30KhVFYu, 30 KhGSA, 30 KhGSNA) pointed to a destruction of the metal along the boundary of the primary grain. On the strength of tests it is assumed that nitrides, especially aluminum nitride (I), accumulate at these boundaries and produce a weakening. This assumption was examined in the present case by means of an electron microscope and an electronograph. By an electrolytic heating, a thin coating layer was obtained at the site of fracture, which could be removed by the reagent according to Popova and examined. On the microphotograph of a fracture in the steel 40 KhNMA (Fig 1) one can well observe the inclusions, the forms of which are represented even better by the electron microscope (Fig 2). The phase composition of these inclusions was investigated by the X-ray structure- and electronographic method. In the X-ray picture (I) was observed in the

Card 1/2

Examination of Interdendritic Nonmetallic Streaks in Cast Steel

steel 38 KhVFYu (I), and (I) and VN in samples with big faults, (I) and $F_3Al_2(SiO_4)_3$ in the steel 12 Kh2N4A - (I), and (I) in the steel 40 KhNMA - (I). The electronograms (Fig 3 for 40KhNMA) corresponded to a crystal lattice of (I). In order to convert structural components from a disperse to a crystalline form, the samples were treated in the vacuum (at 800° for 2 hours); a fine formation of stains (Fig 4) was observed and the distinct electronogram of a polycrystal (Fig 5) was obtained with three phases - a spinel lattice, (I) and a phase which could not be identified. A test storing in the vacuum at room temperature for some days showed a crystallization, the electronogram of which is described (Table). There are 5 figures and 1 table.

ASSOCIATION: Zlatoustovskiy metallurgicheskiy zavod, Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii (Zlatoust Metallurgical Works, Central Scientific Research Institute of Iron Metallurgy)

9(7),18(7)

AUTHORS: Orlov, L. G., Utevskiy, L. M. SOV/32-25-9-21/53

TITLE: On the Ways of Investigating the Surface of Fractures by the Aid of the Electron Microscope

PERIODICAL: Zavodskaya laboratoriya, 1959, Vol 25, Nr 9, pp 1084-1087 (USSR)

ABSTRACT: Electron microscopic investigations of fracture surfaces and ground sections of metal can be carried out by direct, indirect and semi-direct methods (Ref 1). The possibility of investigating the inter-crystalline fractures, the so-called micro-diffraction investigation, is particularly mentioned, and for this purpose the domestic industry has begun a series production of the electron microscopes EM-5 and UEMB-100. The production of the impressions is explained and some electron microphotographs (EM) are given to illustrate characteristic brittle and ductile fractures of steel samples obtained during shock- and tensile tests at different temperatures. The impressions were taken with coal dust followed by separation of the carbon film together with the inclusions with the reagent by N. M. Popova. By means of the (EM) of a shearing surface of a steel low in carbon (Fig 1) the so-called "river design" is explained. The trans-crystalline corrosion of a tempered and drawn steel can

Card 1/2

On the Ways of Investigating the Surface of Fractures by the Aid of the Electron Microscope

SOV/32-25-9-21/53

also take place along the surfaces of closely strewn carbide deposits (Fig 2, steel 20Kh2N2) Micro-diffraction tests carried out together with N. M. Popova (on a 400 kv microscope of his construction) showed that in brittle inter-crystalline fractures in which the spillies run along the contours of the carbide particles (Fig 4) the crystal lattice of these particles on the whole remained unchanged after the fracture. With the ductile fracture (Refs 15, 16) given in publications, the failure crack occurs at the grain boundary (around larger inclusions) as could be ascertained in the case under review (Fig 5). The extent of the plastic deformation can also be evaluated from the deformation type of the particles (Fig 6). There are 6 figures and 16 references, 10 of which are Soviet.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii (Central Scientific Research Institute for Ferrous Metallurgy)

Card 2/2

PHASE I BOOK EXPLOITATION SOV/5412

Utevskiy, Lev Markovich

Otpusknaya khrupkost' stali (Temper Brittleness of Steel) Moscow, Metallurgizdat, 1961. 191 p. 4,200 copies printed.

Ed.: R. I. Entin; Ed. of Publishing House: Ye. N. Berlin; Tech. Ed.: Ye. B. Vaynshteyn.

PURPOSE: This book is intended for scientific workers and engineers in physical metallurgy and may also be used by students in schools of higher education.

COVERAGE: Fundamental experimental data on the phenomenon of reversible temper brittleness of constructional alloyed steel are presented. Also discussed are methods and results of the experimental research as well as new concepts which have developed concerning the nature of this type

Card 1/10

of brittleness. The research methods which have been worked out may be applied also to the solution of other problems in physical metallurgy, particularly to those problems connected with processes occurring along the grain boundaries. The experimental work was carried out in the Laboratory for Phase Changes at the Institut metallovedeniya i fiziki metallov TsNIIChM (Institute of Physical Metallurgy and Physics of Metals at the Central Scientific Research Institute of Ferrous Metallurgy im. I. P. Bardin). The author thanks G. V. Kurdyumov, Academician, and R. I. Entin, Professor, Doctor of Technical Sciences, for their assistance, interest, and advice. He also thanks L. G. Orlov, Engineer, G. L. Ivanova, N. I. Kol'tsova, Engineer, R. M. Koshelevskiy, Engineer, Ye. K. Belova, Engineer, and A. I. Rizol' and L. G. Sakvarelidze, Candidates of Technical Sciences, for their work in the experiments and investigations. There are 240 references: 137 Soviet and 103 non-Soviet.

BAGARYATSKIY, Yuriy Aleksandrovich; GOLOVCHINER, Yakov Mendelevich; IL'INA, Vera Alekseyevna; KAMINSKIY, Emmanuil Zel'manovich; KARDONSKIY, Viktor Mikhaylovich; KRITSKAYA, Vladislava Kasimirovna; LYSAK, Leonid Ivanovich; OSIP'YAN, Yuriy Andreyevich; PERKAS, Mark Davydovich; ROZENBERG, Vladimir Moiseyevich; SANDLER, Naum Isaakovich; TRAVINA, Nadezhda Trofimovna; UTEVSKIY, Lev Markovich; BERLIN, Ye.N., red.izd-va; VAYNSHTEYN, Ye.B., tekhn.red.

[Radiography in metallography] Rentgenografiia v fizicheskom metallovedenii. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1961. 368 p. (MIRA 14:7)
(Metallography) (X-rays—Industrial applications)

UTEVSKIY, L.M., kand.tekhn.nauk

Temper brittleness in steel. Metalloved. i term. obr.met. no.6:35-41 Je '61. (MIRA 14:6)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii.
(Steel—Brittleness)
(Tempering)

29703
S/181/61/003/010/035/036
B125/B102

18.9100

AUTHORS: Orlov, L. G., and Utevskiy, L. M.

TITLE: Electron microscopic observation of the motion of dislocations in alpha iron

PERIODICAL: Fizika tverdogo tela, v. 3, no. 10, 1961, 3242 - 3246

TEXT: The present paper deals with an electron optical dark-field observation of a 50μ thick alpha-iron foil cut in parallel to the {111} plane (chemical composition: 0.013 C, 0.03 Si, 0.04 Mn, 0.004 S, 0.002 P), which was made with a УЭМБ-100 (UEMB-100) electron microscope. An accelerating voltage of 75 kv was applied. Stresses arising in the electron-irradiated foil displace the dislocations in the thin film, and characteristic contrast tracks are left over as a result. In an annealed foil, dislocations are very difficult to displace by electron bombardment, evidently due to the absence of free dislocations. The tracks caused by the motion of dislocations, while looking roughly curvilinear, in reality consist of straightlined segments. This change in direction of the tracks is ascribed to dislocations which pass from one slip plane to another.
Card 1/2

Electron microscopic observation...

The intersection between two slip planes, where screw dislocation passes from one plane to another, is the projection of the direction of Buerger's vector. The foil thickness was determined from the width of the projection of a known slip plane. It was found to be ~1200 A. It was experimentally proved that dislocations in iron also glide on planes of the types {110} and {211}, and that they frequently pass over from one type to the other by transverse gliding. There are 3 figures and 7 references: 2 Soviet and 5 non-Soviet. The three most recent references to English-language publications read as follows: D. G. Brandon, J. Nutting. Journ. Iron a. Steel Inst., 196, 2, 160, 1960; W. Cannington, K. F. Hale, D. Mc Lean. Proc. Roy. Soc., A 259, 1297, 203, 1960; B. Gale, K. F. Hale. Brit. Journ. Appl. Phys., 12, no. 3, 1961.

ASSOCIATION: Institut metallovedeniya i fiziki metallov Moskva (Institute of Metallography and Physics of Metals, Moscow)

SUBMITTED: June 28, 1961

Card 2/2

USIKOV, M.P.; UTEVSKIY, L.M.

Transfer of plastic deformation by "relay." Fiz. met. i metalloved. 11 no.6:952-954 Je '61. (MIRA 14:6)

1. Institut metallovedeniya i fiziki metallov TSentral'nogo nauchno-issledovatel'skogo instituta chernoy metallurgii.
(Deformations (Mechanics))

5.5330
18.9100

21393
S/032/61/027/012/004/015
B104/B108

AUTHORS: Usikov, M. P., and Utevskiy, L. M.

TITLE: Origin and interpretation of the contrast of an electron-microscopic image of a metal foil

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 12, 1961, 1481 - 1486

TEXT: The production of the diffraction contrast in an electron-microscopic image is studied. Formulas for the amplitudes of electron waves scattered by perfect and imperfect crystal lattices are derived on the basis of non-Soviet bloc papers (D. Heidenreich. J. Appl. Phys., 20, 993 (1949); N. Katc. J. Sol. Japan, 7, 397 (1952); 8, 350 (1953); M. J. Whelan, P. B. Hirsch. Phil. Mag., 2, 1121, (1957); M. J. Whelan. J. Inst. Metals, 87, 392 (1959); P. B. Hirsch, A. Howie, M. J. Whelan. Phil. Trans. Roy. Sol. of London [A], 252, 499 (1960); H. Hashimoto, A. Howie, M. J. Whelan. Phil. Mag., 5, 57, 967 (1960); G. Borrmann, Phys. Z., 42, 157 (1941); 127, 297 (1950)). The width of the image of a dislocation is estimated: $\Delta x \approx t'_o/\pi$ (t'_o = distance between two extinctions). The image of a thin metal foil (Fig. 4) is interpreted. It is shown that for studying the

Card 1/3

Origin and interpretation of the ...

dislocation structure of a crystal specimen, sufficiently thin parts of it may be used. As far as possible these parts should be at some distance from the edges of the foil. The properties of the individual dislocations and their interactions and motions can, however, also be observed close to the edges of the foil. It must also be borne in mind that some of the dislocations and defects remain invisible. There are 5 figures and 9 references: 1 Soviet and 8 non-Soviet.

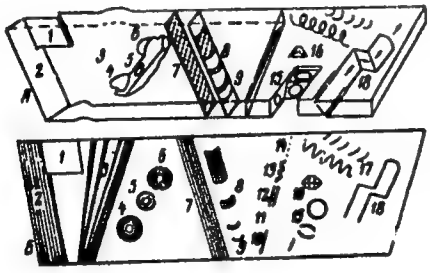
ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im. I. P. Bardina (Central Scientific Research Institute of Ferrous Metallurgy imeni I. P. Bardin)

Fig. 4. Schematic representation of the image of a metal foil under an electron microscope. Legend: (A) foil with the most essential defects; (B) image of the foil; (1) - (6) variations in thickness and inclination of the foil; (7) - (18) defects of the crystalline structure; (1) thickness variation; (2) wedge-shaped end; (3) warping of the foil; (4) depression; (5) pore; (6) hump; (7) defect of the crystal packing; (8) split dislocations with packing defects of varying widths; (9) dislocation; (10) - (14)

Origin and interpretation of the ...

long dislocation, various contrast effects; (10) ordinary dislocation; (11) invisible dislocation; (12) double image of a single dislocation; (13) zigzag dislocation; (14) dotted image; (15) dislocation loops; (16) tetrahedral packing defect; (17) helical dislocation; (18) trace of a migrating dislocation.

Fig. 4



Card 3/3

S/032/61/027/012/005/015
B104/B108

AUTHORS: Orlov, L. G., Usikov, M. P., and Utevskiy, L. M.

TITLE: Use of microdiffraction for the electron-microscopic examination of metals

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 12, 1961, 1486 - 1490

TEXT: Structural analyses of small sections of metal foils can be conducted with the adjustable elements of a modern electron microscope (intermediate lens, variable aperture, and special microdiffraction diaphragm). The method of these structural analyses is described. The application of the microdiffraction method for various purposes is demonstrated by several examples. New results are not given. G. S. Zhdanov (Rentgenografiya metallov, ch. II., Gostekhizdat (1938)) is mentioned. There are 5 figures and 6 references: 5 Soviet and 1 non-Soviet.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im. I. P. Bardina (Central Scientific Research Institute of Ferrous Metallurgy imeni I. P. Bardin)

Card 1/1

3h843
S/129/62/000/003/004/009
E021/E335

18.5100
AUTHORS: Usikov, M.P., Engineer and Utevskiy, L.M., Candidate of Technical Sciences

TITLE: Change in the dislocation structure of 1Kh18N9T (1Kh18N9T) steel during hardening and softening

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, no. 3, 1962, 18 - 20 + 2 plates

TEXT: Rolled samples, 0.04 mm thick were annealed in evacuated vessels at 1 100 °C and deformed by 0.3 - 10%. Some of the unannealed samples (with 96% deformation) were heated at 400 - 800 °C for 1 hour. The strip was thinned after various treatments by electrolytic polishing in a mixture of 60% H_3PO_4 and 40% H_2SO_4 at 2 - 4 A/cm^2 current density and 60 °C. The obtained 1 000 - 2 000 Å thick foil was examined by an electron-microscope. Dislocations show up because the distorted zone along a dislocation has a strong scattering effect on the electrons and the intensity of the beam decreases. Thus, dislocations show up as dark lines. It was found that the annealed

Card 1/3

Change in the dislocation ....

material had only a low density of dislocations. No dislocations were observed within the grains. Dislocations were seen only at grain boundaries with small degrees of misorientation. The density in the field of view (25 μ^2) was 10^5 cm^{-2}. Plastic deformation of 1% led to the appearance of dislocations within the grains. The calculated dislocation density was 10^9 cm^{-2}. There was only one slip system in each grain. In the case of deformation in excess of 1%, slip on secondary systems occurred. Dislocations moving on different slip planes interact with one another and the material begins to harden. The dislocation density for 2% deformation was 2×10^9 cm^{-2}. Finally, deformations greater than 8% produced a large quantity of dislocation networks; thick "clouds" of dislocations were observed inside the grains. A dislocation density of 10^{10} cm^{-2} was observed after 10% deformation. The density of dislocations after cold-rolling (96%) was difficult to determine but was obviously greater than 10^{12} cm^{-2}. Softening by heating

Card 2/3

Change in the dislocation ....

to temperatures below the beginning of recrystallization led to no visible change in the positions and density of dislocations. Recrystallization began at 625 °C and subgrains, free from dislocations and with sharp boundaries, developed. There were no dislocations inside the grains at 700 °C and the structure in this state differed from the annealed structure only in the smaller grain size.
There are 5 figures.

ASSOCIATION: TsNIIChM

Card 3/3

S/717/62/000/007/004/010
D207/D303

AUTHORS: Orlov, L.G., and Utevskiy, L.M., Candidate of Technical Sciences

TITLE: Investigation of the micromechanism of the process of fracture of steel and iron using the method of electron-microscopic fractography

SOURCE: Dnepropetrovsk. Institut metallovedeniya i fiziki metallov. Problemy metallovedeniya i fiziki metallov, no. 7, Moscow, 1962, 156 - 174

TEXT: The authors discuss briefly the techniques of electron-microscopic study of the fracture surfaces. They also describe their own results on iron and steel. Replicas were obtained by deposition of carbon films on fracture surfaces which were then separated by electrolytic etching or by using a reagent suggested by N.M. Popova (Ref. 15: Karbidnyy analiz (Analysis of Carbides) Mashgiz, 1949). The replica micrographs (magnifications of 600 - 15,000) were examined in a stereocomparator or with a stereomicrometer. In this way, quantita-

tive measurements of the surface relief were made. Reproductions of replicas are given in the article. They are discussed for iron and steels which suffered brittle fracture of transcrystalline (across grains) and intercrystalline (along the grain boundaries) types. The transcrystalline fracture occurred usually along cleavage planes and the intercrystalline fracture was observed in samples with temper brittleness (obtained by quenching, followed by 500°C tempering). The authors reproduce also and discuss the ductile fracture surfaces in iron and steel. There are 14 figures and 32 references: 13 Soviet-bloc and 19 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: C. Crussard, R. Borione, J. Plateau, J. Morillon and F. Maratray, J. Iron and Steel Inst., 183 146 - 177, 1956; G.T. Hahn, W.S. Owen, B.L. Averbach, and M. Cohen, Welding J., 38, 9, 1959; E. Wessel, J. Metals, 9, 930, 1957; J. Washburn, A.E. Gorum, and E.R. Parker, Trans. Met. Soc. AIME, 215, 2, 1959.

Card 2/2

S/053/62/076/001/003/004
B117/B101

AUTHORS: Orlov, L. G., Usikov, M. P., Utevskiy, L. M.

TITLE: Electron-microscopic examination of dislocations in metals

PERIODICAL: Uspekhi fizicheskikh nauk, v. 76, no. 1, 1962, 109 - 152

TEXT: This is a survey on results achieved by applying electron microscopy to the observation of dislocations in metals. First, the principles of the investigation method are dealt with: Type of specimens to be used, procedure of observation, electron-microscopic representation of defects in crystalline structure, formation of diffraction contrasts. In the following, the principal results obtained as to the formation of dislocations, their motion and interaction, structure of deformed metal and solidification, dislocations and point defects, general and specific data as to the structure of thin foils are given. The authors point out that the theory of dislocations and numerous predictions as to particular properties of defects have been confirmed experimentally during the last 5 years by using transmission beam microscopes for the direct examination of the dislocation structure. In this connection, it is stressed that

Card 1/2

Card 2/

UTEVSKIY, L.M., kand.tekhn.nauk

Some consequences of the nonsimultaneousness of supersaturated solid solution decomposition inside and along the boundaries of polycrystalline grains. Probl.metalloved.i fiz.met. no.7:198-218 '62. (MIRA 15:5)
(Alloys—Metallography) (Metal crystal)

S/137/62/000/012/024/085
A006/A101

AUTHORS: Orlov, L. G., Utevskiy, L. M.

TITLE: Studying the micromechanism of the process of steel and iron failure by the method of electron-microscopic fractography

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 12, 1962, 46 - 47, abstract 121277 ("Sb. tr. In-t metalloved. i fiz. metallov Tsentr. n.-i. in-ta chernoy metallurgii", 1962, v. 7, 156 - 174)

TEXT: The method of electronic microfractography was used to study brittle and ductile fractures of iron and steel specimens. To preserve a portion of the carbide phase, electrolytic etching and separation of films in a special reactive agent, were used. An analysis of the transcrystalline splinters in brittle failure of Fe revealed steps in the splinter which flow together to form one larger step. In brittle failure strong plastic deformations at the final stage of breakdown take place besides plastic deformation, preceding crack formation. The deformation is sharply localized in the thin layer of the order of hundreds and even tens of Ångstroem. and forms a major part of the total plastic deformation

Card 1/2

Studying the micromechanism of the...

of the specimen prior to failure. During the investigation of intercrystalline fractures of structural alloyed steels in the state of temper brittleness, it is noted that cracks, propagating along the grain boundaries, spread around the outlines of encountered carbide particles. The surface of ductile fractures consists of concave cells. The final stage of ductile failure is characterized by a very strong, sharply localized, plastic flow, producing deformations of hundreds of percent; the particles of the second phase are then split into halves. There are 32 references.

P. Zubarev

[Abstracter's note: Complete translation]

Card 2/2

S/126/62/013/005/009/031
E091/E435

AUTHORS: Usikov, M.P., Utevskiy, L.M.

TITLE: Change in the dislocation structure of nickel on alloying with titanium, chromium and aluminium

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.5, 1962, 701-709

TEXT: This is the first paper on systematic investigations of the dislocation structure of nickel and its alloys, to establish the fundamental influences of elements on the behaviour of dislocations and on the nature of the dislocation structures forming during plastic deformation. Nickel and the following alloys were melted in an induction furnace and cast into ingots (composition, wt.%)

Card 1/4

Change in the dislocation ...

Alloy	Cr	Ti	Al
XH80 (KhN80)	19.70	-	-
HT4 (NT4)	-	4.25	-
HЮ4 (NYu4)	-	-	4.15
XH80T2Ю (KhN80T2Yu)	19.70	2.23	0.67
XH80T3Ю (KhN80T3Yu)	19.55	2.67	1.05

The ingots were forged to billets which were rolled, with intermediate annealing, down to a thickness of 0.03 to 0.1 mm. The strip obtained was annealed in evacuated ampules at 1000°C. The specimens were cut into two portions, one of which was deformed in tension to 0.5 - 10% at room temperature; the other portion of the Ni, KhN80, NT4 specimens was deformed in tension in a special vacuum apparatus at approximately 50°C below the recrystallization temperature of each alloy. The strips were

Change in the dislocation ...

then thinned down to 500 - 2000 Å by means of electrolytic polishing for inspection under an electron microscope. It was found that there are virtually no dislocations within the grains of nickel and its alloys in the annealed state. However, even in the early stages of work-hardening, dislocation networks form. With increase in the degree of deformation, a characteristic cellular structure forms. The distribution of dislocations in nickel changes radically by alloying it with titanium, chromium and aluminium. The behaviour of dislocations in the binary alloys KhN80, NT4 and NYu4 resembles that of dislocations in stainless steel; their movement in the early stages of deformation proceeds along strictly straight paths and, provided the foil is sufficiently uniform in thickness, the dislocation traces always form perfectly straight bands. At above 10% deformation, the structure of binary alloys becomes cellular. The above difference between the dislocation structure of nickel and its alloys is due to a decrease in the stacking fault energy on alloying nickel. This increases the width of the stacking fault, which hampers transverse slip, i.e. the transition of dislocations from one slip plane to another. The dislocation

Change in the dislocation ...

structure of the ternary alloys KhN80T2Yu and KhN80T3Yu, after 1 to 2% deformation followed by annealing at 1000°C with subsequent air cooling, is similar to that of the binary alloys at the same degree of deformation. At higher degrees of deformation however isolated regions with very high dislocation densities become visible. The formation of dislocation is in pairs, associated with the ordering of the solid solution; the first dislocation disturbs the order and the second restores it. The dislocation structure of alloys deformed in tension at elevated temperatures differs fundamentally from that obtained by deformation at room temperature; no conglomeration of dislocations occurs at elevated temperatures. There are 12 figures and 1 table.

ASSOCIATION: Institut metallovedeniya i fiziki metallov TsNIIChM (Institute of Science of Metals and Physics of Metals TsNIIChM)

SUBMITTED: July 14, 1961

Card 4/4

ORLOV, L.G.; USIKOV, M.P.; UTEVSKIY, L.M.

Observation of dislocations in metals by means of an electron microscope. Usp. fiz. nauk 76 no.1:109-152 Ja '62.
(MIRA 15:2)

(Dislocations in crystals)
(Electron microscope)

UTEVSKIY, L. M. and USIKOV, P. M.

"Application of Electron Microscopy for Alloy Structure Studies."

report presented at the 3rd Conference of Higher Educational Institutes on Strength and Plasticity of Metals, Petrozavodsk State University, 24-29 June 1963

S/181/63/005/001/016/064
B102/B186

AUTHORS: Usikov, M. P., and Utevskiy, L. M.

TITLE: Electron microscopic study of the polygonization in nickel and Ni-Cr alloys

PERIODICAL: Fizika tverdogo tela, v. 5, no. 1, 1963, 100-107

TEXT: The changes that occur in the dislocation structure when a material which has been elongated 5% is heated were studied on 30-50μ foils of nickel and nichrome using electron microscopes of the types UEMB-100 (UEMB-100) and JEM-6A. It was found that owing to the polygonization a hexagonal and sometimes a polygonal dislocation network is formed. The differences in the polygonal dislocation structure of Ni and Ni-Cr must be ascribed to the primary differences in the dislocation distributions. They are connected with a decrease in the energy consumed in the destruction of the packing when Ni is alloyed with Cr. Before their elongation all the specimens were heated to 1000°C in vacuo. After the elongation they were heated again, viz. nickel to 400-900, Ni-Cr to 600-1100°C, and were kept at these temperatures during periods of from

Card 1/2

10 sec to 100 hrs. Conclusions: After 0.5 - 1 hr polygonization is practically completed in Ni at 700°C and in Ni-Cr at 900°C. It can be concluded that ascending character of the dislocations is rendered more difficult in Ni-Cr. This can, however, not be attributed to a hindered selfdiffusion but to the large width of the split dislocations which increases with temperature. In regions where one slip system with dislocations with one sign are effective, polygonization takes place according to the Mott scheme. If several slip systems are effective simultaneously, a dislocation network is formed on polygonization: in Ni-Cr it is a plane, mainly hexagonal network, in Ni it is a less regular spatial network which may partly be plane. There are 6 figures.

ASSOCIATION: Institut metallovedeniya i fiziki metallov TsNIIChM, Moskva (Institute of the Science of Metals and Physics of Metals of TsNIIChM, Moscow)

SUBMITTED: July 20, 1962

ORLOV, L.G.; UTEVSKIY, L.M.

Microtwins in iron deformed at low temperatures. Fiz. met. i metalloved. 16 no.4:617-619 O '63. (MIRA 16:12)

1. Institut metallovedeniya i fiziki metallov TSentral'nogo nauchno-issledovatel'skogo instituta chernoy metallurgii.

UŞIKOV, M.P.; UTEVSKIY, L.M.

Direct observation of the interaction of dislocations with particles of the second phase. Zav.lab. 29 no.8:944-948 '63. (MIRA 16:9)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni I.P.Bardina.
(Alloys—Metallography)

ANTONOVA, V.A.; UTKVSKIY, L.M.

The structure of steel following low-temperature thermomechanical treatment. Dokl. AN SSSR 148 no.2:325-327 Ja '63. (MIRA 16:2)

1. Institut metallovedeniya i fiziki metallov TSentral'nogo nauchno-issledovatel'skogo institut chernoy metallurgii. Predstavleno akademikom G.V. Kurdyumovym.
(Steel—Testing) (Metals at low temperatures)

ROYTBURD, A. L.; USIKOV, M. P.; UTEVSKIY, L. M.

"On the creep mechanism of nickel and its alloys."

report submitted for 3rd European Regional Conf, Electron Microscopy, 26 Aug-3 Sep 64, Prague.

SPASSKIY, M. N.; UTEVSKIY, L. M.; KHASHIMOV, F. R.

"On the peculiarities of martensite forming in deformed austenite."

report submitted for 3rd European Regional Conf, Electron Microscopy, Prague, 26 Aug-3 Sep 64.

ROYTBURD, A.L.; RUTBERG, V.P.; USIKOV, M.P.; UTEVSKIY, L.M.

Microstresses in polycrystals. Fiz. tver. tela 6 no.1:320-322 Ja '64. (MIRA 17:2)

1. Institut metallofiziki, Moskva.

UTEVSKIY L M.

by Z. G. Pinsker ("Basis of diffractional methods of investigation of perfect crystals"), B. M. Rovinskiy and L. M. Rybakova ("Investigation of dependence of mechanical properties on characteristics of structure of metals"-), L. M. Utevskiy and P. M. Usikov ("Application of microscopy in investigation of structure of alloys"), A. A. Predvoditelev and N. A. Tyapunina ("Role of reproduction of dislocations in process of plastic flow"), A. V. Pertsov, N. V. Pertsov and E. D. Shukin "Self-producing internal dispersion of metals under action of strongly superficially-active metallic melting") and I. L. Mirkin ("Problems of structural investigations, advanced by requirements of progress of technology").

reports presented at the 3rd Intervuz Conference on Strength and Ductility of Metals, Petrozavodsk State University, 24-29 June 1963.
(reported in Fizika Metallov i Metallovedeniye, Vol. 16, No. 4, 1963, p 640.
JPRS 24,651 19 May 1964.

L 17685-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(b) Pad IJP(c)/AFWL/SSD/ASD(f)-2/ASD(m)-3/AFETR JD/HW

ACCESSION NR: AP4049464 S/0020/64/159/002/0317/0320

AUTHORS: Roytburd, A. L.; Usikov, M. P.; Utevskiy, L. M.

TITLE: On the mechanism of plastic deformation in stationary creep of metals

SOURCE: AN SSSR. Doklady*, v. 159, no. 2, 1964, 317-320, and insert facing p. 318

TOPIC TAGS: plastic deformation, creep, dislocation study, dislocation motion, nickel alloy

ABSTRACT: An electron-microscopic study was made of the dislocation structure produced during the creep process. The purpose of the study was to check whether nonconservative dislocation motion can actually be neglected in the case of high temperatures and low stresses. [illegible] with 20% Cr, 1.2% Ti, and 0.6% Al. [illegible] ribbon specimens [illegible] mm

Card 1/3

L 17688-65
ACCESSION NR: AP4049484

4

thick) were deformed under creep conditions at 700C in vacuum. To fix the dislocation structure, the samples were unloaded only after total cooling. The samples were then electrolytically polished and observed in a JEM-6A electron microscope at 80 and 100 kV accelerating voltage. The main elemerts observed after creep are helicoidal dislocation whose shape is distorted by the plastic deformation. This dislocation has an appreciable velocity of nonconservative motion, giving rise to a plastic deformation rate of 10^{-5}--10^{-6} sec^{-1}. It is concluded that in contrast to earlier opinions, a considerable fraction of the deformation, if not all, in high-temperature stationary creep is the result of nonconservative motion of helicoidal dislocations, limited by closed self-diffusion flow. The origin of the dislocations calls for additional study. This report was presented by G. V. Kurdyumov. Orig. art. has: 3 figures and 4 formulas.

ASSOCIATION: Institut metallovedeniya i fiziki metallov Tsentral'-

Card 2/3

L 17688-65
ACCESSION NR: AP4049484

nogo nauchno-issledovatel'skogo instituta chernoy metallurgii (Institute of Metal Research and Metal Physics, Central Scientific Research Institute of Ferrous Metallurgy)

SUBMITTED: 07May64 ENCL: 00

SUB CODE: MM, SS NR REF SOV: 004 OTHER: 002

Card 3/3

EWP(t)/EWA(d)/EWP(t) EWP(w) IJP(c) JW/JD

ACCESSION NR: AP5011260

AUTHOR: Usikov, M. P.; Utevskiy, L. M.

TITLE: Electron microscope investigation of the dislocation structure of nickel and its alloys

SOURCE: Dnepropetrovsk. Institut metallovedeniya i fiziki metallov. Problemy metallovedeniya i fiziki metallov, no. 8, 1964, 77-100

TOPIC TAGS: dislocation structure, metal mechanical property, electron microscopy, [illegible] containing alloy, [illegible] alloy

ABSTRACT: The nickel alloys investigated were KhN80 (19% chromium), NTL (...25% titanium), NYuA (4.15% aluminum), KhN80TYuA (19.85% chromium, [illegible] into ribbo 0.03-[illegible]

Card 1/3

L 51988-65
ACCESSION NR: AT5011205

mechanical tests. The ribbon was cut into samples 150 mm long which were annealed at 1,000°C (air cooling). Plastic deformation of the samples was [illegible] by extension [illegible] a conventional non-continuous machine, [illegible] high temperature deformation was carried [illegible] and deformation with time was recorded. [illegible] and the strength limit were determined. Foil with [illegible] and the strength limit were determined. [illegible]

structure formed by cold working [illegible] the structure of large degree of deformation (beta greater than 1) the structure of binary alloys becomes cellular, similar [illegible] the structure of alloys under the same deformations. Investigation of the polygonization structure of the two-phase alloy KhN80T2Yu are presented in detail. The redistribution of dislocations during polygonization was investigated. Experiments on polygonization were made [illegible] and nichrome after cold working with an extension of [illegible] heating did not cause recrystallization. The activation [illegible] was investigated [illegible] high temperature deformation. A study was made of [illegible]

Card 2/3

L 51988-65
ACCESSION NR: AT5011205

structure in the creep process using previously annealed samples of

ASSOCIATION: [illegible]
(Institute of Physical Metallurgy)
SUBMITTED: 00 ENCL: SUB CODE:

NR REF SOV: 010 OTHER: 05

Card 3/3

UTEVSKIY, L.M.

European Conference on Electron Microscopy. Zav.lab. 30 no.12:1524-1525 '64. (MIRA 18:1)

L 59636-65

TITLE: Investigation of welded joints in steam conducting tubes made from heat-resistant austenitic steels

SOURCE: Teploenergetika, no. 1, 1965, 66-69

TOPIC TAGS: martensite steel, welding defect, steel, electron microscope, carbide, chemical composition/ EP 184 steel, EI 695R steel, EP 17 steel, 1Kh18N12T steel, [illegible]N982 steel

ACCESSION NR: AP5002205

were tabulated. The results show inhomogeneous gas saturation in the various weld zones, as in the vicinity of the weld a much larger oxygen content was observed than in the metal proper. The carbide test showed that tungsten was present exclusively as a solid solution. The electron-microscope showed the presence of [illegible] as well as in the [illegible] at least partly oxides. [illegible] observed in the form of plane dendrites. Micro-diffraction analysis showed these to be $(Fe,Cr)_3C_2$ type carbides. These results underscore the necessity of welding in a protective atmosphere [illegible] boundaries. Orig. art. has: 5 figures and 2 tables.

ASSOCIATION: VTI-TsNIIGAM

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 002 OTHER: 000

Card 2/2 SLP

SPASSKIY, M.N.; UTEVSKIY, L.M.; KHASHIMOV, F.F.

Martensite structure and its changes as a result of thermo-mechanical treatment. Fiz. met. i metalloved. 20 no.4:614-622 O '65. (MIRA 18:11)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni I.P.Bardina.

L 27450-66 EWT(m)/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c) JD/HW
ACC NR: AP5027150 UR/0126/65/020/004/0614/0621

AUTHOR: Spasskiy, M.N.; Utevskiy, L.M.; Khashimov, F. R.

ORG: Central Research Institute for Ferrous Metallurgy im. I.P. Bardin (Tsentral'nyy nauchnoissledovatel'skiy institut chernoy metallurgii)

TITLE: Structure of martensite and its changes as a result of heat and mechanical working

SOURCE: Fizika metallov i metallovedeniye, v.20, no.4, 1965, 614-621

TOPIC TAGS: martensite steel, austenite steel, work hardening, metal heat treatment

ABSTRACT: The article presents the results of an electron microscope investigation of the fine structure of martensite and the dimensions and the disorientation of its blocks and fragments. It compares the results of tests after conventional hardening and after heat and mechanical treatment. Samples of alloy N30F2 and steel 40n27 were prepared by cold rolling in the form of strips approximately 0.1 mm thick. Heat and mechanical treatment of the previously annealed strip was supplemented by rolling at 550°. After this treatment, the samples of alloy N30F2 and steel 40N27 were almost completely austenitic. The twinning of martensite crystals, observed in iron-nickel alloys, is found also in

Card 1/2 UDC: 539.25

L 27450-66

ACC NR: AP5027150

other alloys, including steels with a martensite point below 200°. A twinned structure is also characteristic of 40N27 steel. The relatively low density of defects in martensite alloy N30F2 makes it possible to observe the effect of the austenite deformation on the structure of the martensite forming within it. The experimental results show that a 40% deformation of the austenite before the transition leads to creation of a very high density of defects in the martensite. The authors conclude that the heat and mechanical treatment of steel leads to supplementary breaking up of the martensite crystals into fragments, whose size corresponds to the size of the cells of the dislocation structure of the deformed austenite. The reciprocal disorientation of the fragments reaches 10-15%. Orig. art. has: 8 figures.

SUB CODE: MM/ SUBM DATE: 22Jul64/ ORIG REF: 005

OTH REF: 003

Card 2/2

L 33248-66 EWP(k)/EWT(m)/T/EWP(w)/EWA(t)/ETI IJP(c) JD/HW/JG

ACC NR: AT6013926 SOURCE CODE: UR/0058/65/000/011/A043/A043

AUTHOR: Usikov, M. P.; Utevskiy, L. M.

TITLE: Electron-microscope investigation of the dislocation structure of nickel and its alloys

SOURCE: Ref. zh. Fizika, Abs. 11E349

REF SOURCE: Sb. tr. In-t metalloved. i fiz. metallov Tsentr. n.-i. in-ta chernoy metallurgii, vyp. 36, 1964, 77-100

TOPIC TAGS: nickel, nickel alloy, crystal dislocation, [redacted], metal hardening, crystal defect, plastic deformation, creep/ [redacted]

ABSTRACT: By direct transmission the authors investigated in an electron microscope the influence of alloying of Ni on the character of its dislocation structure produced during the course of hardening under different conditions of plastic deformation, thermal loss of hardness, and under creep conditions. Alloying with Ti, Cr, and Al leads to a decrease in the energy of the stacking faults (γ), which is manifest in the appearance of flat clusters of dislocations in the single-phase alloys (at small degrees of deformation). It is shown that during the earlier stage of aging (alloy of the "nimonik" type) the dislocations cut through particles of the second phase, whereas the larger particles which are produced during the later aging stage are circuited by the dislocations. Upon polygonization one observes the formation of more or less regular hexagonal grids of dislocations. In creep, prismatic loops of

Card 1/2

L 33248-66

ACC NR: AR6016226

dislocations and helicoidal dislocations are produced. Possible causes of the hardening by alloying (including a two-base alloy), the mechanism of polygonization, and creep are discussed in light of the results. M. Usikov. [Translation of abstract]

SUB CODE: 20

Card 2/2

L 32691-66 EWT(m)/EWP(w)/T/EWP(t)/ETI/EWP(k) IJP(c) JD/HW

ACC NR: AP6012230 SOURCE CODE: UR/0129/66/000/004/0004/0006

AUTHOR: Utevskiy, L. M., Kashimov, F. R.

ORG: TsNIIChERMET

TITLE: Dislocation structure of hot-worked austenite and its "inheritance" by martensite

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no 4, 1966, pp 4-6

TOPIC TAGS: austenitic steel, crystal dislocation, hot working, austenite, martensitic transformation/N30F2 austenitic steel, 40N27 austenitic steel

ABSTRACT: The question of whether defects of austenite are inherited by martensite was experimentally investigated with the aid of electron diffraction microscopy. Specimens of the austenitic steels N30F2 (30% Fe, Ni--2% V; $T_{mart.trans.}$ = -50°C) and 40N27 (27% Fe, Ni--0.4% C; $T_{mart.trans.}$ = -70°C) were either immediately water-quenched from 1100°C or hot-worked (rolled -- v = 50 cm/sec, ϵ = 6-50%) at various temperatures prior to quenching. The necessary amount of martensite was obtained by cooling the specimens at temperatures ~20°C below $T_{mart.trans.}$ Electronmicroscopic examination showed that for specimens of both steels the dislocation density

Card 1/2

ACC NR: AP6012230

increased with degree of deformation; high-temperature deformation (hot-rolling at 550-1000°C) of austenite, even when performed at a fast rate and immediately followed by acute cooling, is accompanied by a process of the polygonization type, however, and the total dislocation density markedly decreases; if, on the other hand, it is not immediately followed by acute cooling, the stability of dislocation formations increases, the subgrain boundaries get finer and more ordered, and ultimately this entire structure is eliminated by recrystallization. As for the austenite-martensite specimens, it was found that martensitic crystals indeed inherit the dislocation structure of austenite: the dislocation boundaries of austenite do not terminate at the austenite-martensite interfaces but continue in martensite. This is not a general rule, however, since, e.g. certain most mobile dislocations may be "swept out" by the growing crystal of martensite. Therefore, the term "inheritance" must be applied with reservations. Thus, low-temperature deformation (<550°C) creates a high and non-uniform dislocation density in the austenite and correspondingly increases the dislocation density of the austenite, thus enhancing the resistance of steel to plastic deformation. High-temperature deformation (hot rolling at 550-1000°C), on the other hand, results in an improved polygonal structure of austenite and it also fragments the crystals of martensite; it reduces the grain size and increases the plasticity and toughness of the steel, thus preventing its premature (intergranular) fracture.

SUB CODE: 11, 13 . SUBM DATE: none/ ORIG REF: 001

Card 2/2 BLG

L 36552-66 EWT(1)/EWT(m)/T/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6015758 (A,N) SOURCE CODE: UR/0048/66/030/005/0758/0760

AUTHOR: Vasichev, B. N.; Murashko, G. M.; Utevskiy, L. M.

ORG: none

TITLE: Solution of some experimental problems with the aid of the EMMA-2 electron microscope-microanalyzer /Report, Fifth All-Union Conference on Electron Microscopy held in Sumy 6-8 July 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 5, 1966, 758-760

TOPIC TAGS: x ray analysis, electron microscope

ABSTRACT: About half of the present paper is devoted to a brief description of the EMMA-2 electron microscope microanalyzer which was fabricated from a Tesla desk model electron microscope. A condenser system was provided which produced an electron beam probe with a diameter less than 1 μ on the object. The second condensing lens of this system had a very short working distance, which made it possible to increase the angle of departure of the x rays from the object to 28°. The instrument was equipped with two small x-ray spectrometers employing LiF or mica crystals. The projection system of the microscope was left unaltered; this made it possible directly to observe the position, shape, and size of the probe when working with a thin object, and to bring the probe accurately into coincidence with the desired part of the object. The power

Card 1/2

L 36552-66

ACC NR: AP6015758

4

supply of the microscope was so altered as to make it possible to vary the accelerating potential in steps from 25 to 70 kV. In the remainder of thepaper three applications of the instrument are discussed briefly. In one experiment a thin film of an iron-molybdenum alloy was examined. The alloy had been heated for 30 minutes in an argon atmosphere. The film was found to contain inclusions with enhanced molybdenum content. In a second experiment, x-ray analysis of a heat treated austenitic chrome-nickel steel revealed the presence near the carbide inclusions of zones enriched in nickel and impoverished in chromium. Extraction replicas provided the possibility of determining the shape and distribution of the inclusions, and the chemical composition of the particles in the replica could be determined by x-ray microanalysis. In the third experiment the small particles resulting from explosion in vacuum of a nichrome wire were examined. The particles were found all to have the same composition. Orig. art. has: 4 figures.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 003/ OTH REF: 003

Card 2/2 mlp

PEREPELKIN, K. Ye.; UTEVSKIY, L. Ye.

Process of acetylation of fiber from polyvinyl alcohol. Khim. volok. no.6:7-10 '62. (MIRA 16:1)

1. Leningradskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta iskusstvennogo volokna.

(Textile fibers, Synthetic)
(Vinyl alcohol polymers)
(Acrylation)

UTEVSKIY, L.Ye.; PEREPELKIN, K.Ye.

Effect of thermal treatment on the properties of polyvinyl alcohol fibers. Khim. volok. no.5:19-22 '63. (MIRA 16:10)

1. Leningradskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta iskusstvennogo volokna.

VOL'F, L.A.; MEOS, A.I.; PEREPELKIN, K.Ye.; UTEVSKIY, L.Ye.

Studying the thermomechanical properties of extra-strong polyvinyl alcohol fibers in water. Izv.vys.uchab.zav.; tekh.tekst.prom. no.5:11-15 '64. (MIRA 18:1)

1. Leningradskiy institut tekstil'noy i legkoy promyshlennosti imeni S.M.Kirova.

PEREPELKIN, K.Ye.; UTEVSKIY, L.Ye.; OKLOVA, A.I.; STEFANOVICH, L.P.

Studying the structure of polyvinyl alcohol fibers by the iodine sorption. Khim.volok.no.5:17-19 '64. (MIRA 17:10)

1. Leningradskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta iskusstvennogo volokna.

UTEVSKIY, L.Ye.; PEREPELKIN, K.Ye.

Thermal treatment of polyvinyl alcohol fibers with a varicus draft multiplicity factor. Khim. volok. no.5:21-23 '65.
(MIRA 18:10)

1. Leningradskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta iskusstvennogo volokna.

L 34824-66 EWT(m)/EWP(j)/T RM

ACC NR: AP6017600 (A) SOURCE CODE: UR/0183/66/000/001/0015/0017

AUTHOR: Utevskiy, L. Ye.; Yanovskaya, N. B.

ORG: [Utevskiy] Leningrad Affiliate of the VNIIV (Leningradskiy filial VNIIV); [Yanovskaya] LITLP im. S. M. Kirov

TITLE: Changes in the structure and properties of polyvinyl alchol fibers during heat treatment

SOURCE: Khimicheskiye volokna, no. 1, 1966, 15-17

TOPIC TAGS: polyvinyl alcohol, synthetic fiber, ~~mechanical heat treatment~~, x ray analysis, HEATING, THERMAL EFFECT

ABSTRACT: The authors study water resistance and various other physical and chemical properties of polyvinyl alcohol (PVA) fibers as functions of the heat-treatment temperature. The study specimens were dry-formed PVA fibers. These fibers were subjected 8 times to thermal stretching at 210°C and then heat treated at 160-240°C for five minutes in the fixed state. The following parameters of the heat-treated PVA fibers were determined: the temperature at which a 10% shrinkage takes place in water (from thermomechanical cruves taken in water), density (by the flotation method) and birefringence (on a polarization microscope with a Fedin compensator). These indices determine the overall degree of crder in the structure of the fibers. Changes in fiber

UDC: 677.494.744.72

Card 1/2

L 34824-66

ACC NR: AP6017600

orientation were determined by x-ray analysis. The x-ray photographs were taken on a URS-70 unit in Cu=$K\phi$-radiation with 8 hours exposure time. The plates were then photometrically scanned on an MF-2 microphotometer along the interference rings corresponding to scattering plane (020). It is shown that shrinkage of PVA fibers may be due to the destruction of various bonds and structures in the amorphous and crystalline sections of the fiber. The most probable upper limit for the devitrification region is 190°C, i. e. above this temperature there are no bound hydroxyl groups in the amorphous sections of the fiber. Destruction of secondary structures take place at temperatures of 205-220°C, and actual melting of the crystals takes place at 228-230°C. The structural changes which take place in the temperature intervals given for these regions agree satisfactorily with the results of x-ray structural analysis in these zones and with the data in the literature. It is shown that e increase in water resistance of PVA fibers is basically due to an increase in the overall degree of order of the fibers during heat treatment in the temperature interval corresponding to the region where destruction of secondary structural formations takes place. Orig. art. has: 5 figures.

SUB CODE: 11/ SUBM DATE: 24Jun64/ ORIG REF: 008/ OTH REF: 008

Card 2/2

L 34109-66 EWT(m)/EWP(j) RM

ACC NR: AP6012848 (A) SOURCE CODE: UR/0080/66/039/004/0947/0950

28
B

AUTHOR: Utevskiy, L. Ye.; Perepelkin, K. Ye.

ORG: none

TITLE: Waterproofing and chemical stabilization of products made from polyvinyl alcohol

SOURCE: Zhurnal prikladnoy khimii, v. 39, no. 4, 1966, 947-950

TOPIC TAGS: polyvinyl alcohol, maleic acid, CHEMICAL STABILITY, SOLUBILITY

ABSTRACT: The object of the study was to obtain products from polyvinyl alcohol (PVC) which are water-repellent and stable in boiling water and acid by carrying out a single heat treatment without any additional chemical procedure. The experiments were performed on films cast from a solution of PVC (alkaline saponification) containing various amounts of maleic acid (0 — 50% of the weight of PVC, or 0 — 18.83 mole %). The films were dried for 1 hr at 100 — 105C and were subjected to heat treatment lasting from 2 to 10 min at 220C. Films thus treated were found to be highly waterrepellent, translucent, and chemically stable. It was shown that by changing the maleic acid content of PVC one can obtain films that are insoluble in boiling water and are either very hydrophilic (absorb up

UDC: 547.361.2—126+620.197

Card 1/2

L 34109-66

ACC NR: AP6012848

to 150 wt. % water) or hydrophobic (absorb about 5 wt. % water). The improvement of properties obtained is interpreted in terms of the chemical bonds formed between the maleic acid (or maleic anhydride above 200C) and PVC, primarily cross-linkages. Orig. art. has: 4 figures.

SUB CODE: 07, 11 / SUBM DATE: 04May64 / ORIG REF: 006 / OTH REF: 004

Card 2/2

UTEVSKIY, N.L. [author]; RAVICH-BIRGER, Ye.D. [reviewer].

"Elements of medical microbiology and microbiological techniques." N.L. Utevskii. Reviewed by E.D.Ravich-Birger. Zhur.mikrobiol.epid.i immun. no.8:93-94 Ag '53. (MLRA 6:11)

(Microorganisms) (Utevskii, N.L.)

UTEVSKIY, N.L.

[Medical microbiology and microbiological techniques] Meditsinskaia mikrobiologiya i mikrobiologicheskaia tekhnika. Izd. 2-oe, perer. i dop. Moskva, Medgiz, 1956. (MLRA 10:1)
(MICROBIOLOGY)

UTEVSKIY, Naum L'vovich; YEFREMOVA, S.A., red.; BEL'CHIKOVA, Yu.S., tekhn. red.

[Medical microbiology and microbiological technique] Meditsinskaia mikrobiologiia i mikrobiologicheskaia tekhnika. Izd.3., ispr.i dop. Moskva, Medgiz, 1961. 431 p. (MIRA 14:12)
(MEDICAL MICROBIOLOGY)

UTEVSKIY, Naum L'vovich; YEFREMOVA, S.A., red.

[Microbiology and the technique of microbiological research] Mikrobiologiia s tekhnikoi mikrobiologicheskikh issledovanii. Izd.4., perer. Moskva, Meditsina, 1965. 423 p. (MIRA 18:1)

UTEVSKIY, Yu.B., inzhener.

Floating hydromechanization supply base. Mekh.stroi. 14 no.3:30 Mr '57. (MLRA 10:4)

(Hydraulic engineering)

FATTAKHOVA, L.T.; UTEY, I.V.

Effect of deep subsoiling and two-depth plowing on the microflora of turf-Podzolic soils. Trudy Inst. mikrobiol. no.7:96-101 '60. (MIRA 14:4)

1. Biologicheskiy institut Kazanskogo filiala AN SSSR.
(SOIL MICRO-ORGANISMS) (TILLAGE)

UTEY, I.V., prof.; ZIGANSHIN, A.A., kand.sel'kokhoz. nauk; NEGOROSHKOV, A.L.; ZIGANSHINA, V.S.

Increasing the potential of a plow layer. Zemledelie 25 no.12: 48-55 D '63. (MIRA 17:4)

1. Kazanskiy sel'kokhozyaystvennyy institut.

AKULINICHEV, I.T.; BABSKIY, Ye.B.; GEL'SHTEYN, G.G.; PETROV, G.M.; SKACHKOVA, A.I.; UTEY, N.I.; USHAKOV, V.B.

Electronic modeling of the electricactivity of the heart. Biofizika, 4 no.3:354-360 '59. (MIRA 12:7)

1. Nauchno-issledovatel'skiy institut schetnogo mashinostroyeniya, Institut grudnoy khirurgii AMN SSSR, Moskva i Institut normal'noy i patologicheskoy fiziologii AMN SSSR, Moskva.
(ELECTROCARDIOGRAPHY,
electronic model of electric activity of heart (Rus))

AKULINICHEV, I.T.; BABSKIY, Ye.B.; GEL'SHTEYN, G.G.; PETROV, G.M.; SKACHKOVA, A.I.; UTEY, N.I.; USHAKOV, V.B.

Reproduction of the electrocardiogram by an electronic model system. Biofizika 4 no.5:589-594 '59. (MIRA 14:6)

1. Iz otdela elektromodelirovaniya Nauchno-issledovatel'skogo instituta schetnogo mashinostroyeniya, Instituta grudnoy khirurgii AMN SSSR i laboratorii klinicheskoy fiziologii Instituta normal'noy i patologicheskoy fiziologii AMN SSSR, Moskva.
(ELECTROCARDIOGRAPHY)